

REMARKS

In response to the Office Action dated October 1, 2003, Applicants respectfully request reconsideration. To further the prosecution of the present application, each of the rejections set forth in the Office Action has been considered and is addressed below. The application is believed to be in condition for allowance.

Rejections Under 35 U.S.C. §102

Claims 1-13, 15-21, 23-41, 43-57, and 60-66 stand rejected under 35 U.S.C. §102(e) as purportedly being anticipated by U.S. Patent No. 6,484,173 (herein referred to as O'Hare).

Applicants respectfully traverse this rejection.

Claim 48 has been amended to clarify the claim in a non-narrowing way, and claim 58 has been amended to correct a typo in the number of the claim from which it depends.

Overview of Embodiments of the Present Invention

One embodiment of the present invention is directed to a technique for enabling a device to gain access to one or more devices on a shared resource. One application for use of this embodiment of the present invention relates to a storage system that may be shared by numerous host devices, with logical volumes or devices on the storage system being made accessible to the plurality of host devices.

A host may have privileges to both access data on a logical device and to also provide non-media access requests to the device. As defined in the specification at page 52, line 13, a non-media access request is:

any command(s) requesting information relating to an identified logical volume that does not include accessing data stored by the network devices on a storage media of the storage device corresponding to the identified logical volume (e.g., not read commands, write commands, format commands, etc.).

In conventional systems, a host will not have privileges to perform a non-media access request to a logical device unless it also has data access (e.g., read and/or write) privileges for that logical device.

Applicants discovered that it would be advantageous in some circumstances to provide a host with non-media access privileges for logical devices to which the host does not have data access privileges. An illustrative use for this aspect of the present invention is described in the specification starting at page 51, line 8. Providing these non-media access requests enables a host computer (e.g., computer systems from Hewlett Packard running the HP-UX operating system as described in the specification) to see all of the logical devices presented by the storage system (including those to which it does not have data access privileges), which is necessary to enable the host to have visibility to the logical devices to which it does have data access privileges.

It should be appreciated that the embodiments of the present invention described in Applicants' claims are not limited to the particular example described above, which is provided merely for illustrative purposes to facilitate the Examiner's understanding of at least one application for the aspects of the present invention recited herein. Thus, the Examiner is urged to not rely upon the summary provided above for distinguishing the claims of the present invention over the prior art, but rather, to rely solely on the language of the claims themselves and the arguments presented below.

1. O'Hare

Initially, it is noted that O'Hare is commonly assigned, along with the present application, to EMC Corporation. It is believed that the invention recited in Applicants' claims patentably distinguish over O'Hare.

O'Hare is directed to techniques for controlling access by a plurality of hosts to a shared storage system. In this respect, O'Hare notes that some shared storage systems may be provided in environments wherein multiple hosts sharing access to a storage system are not all controlled by a single entity (e.g., a single company), such that it is undesirable to allow indirect access by one host to the portions of the data storage device allocated to another host. (col. 1, lines 40-57). O'Hare specifically indicates that there is a risk of such unintended indirect access being provided through the use of system calls, which do not directly read and write data, but may cause one host to indirectly access data allocated to another. (col. 1, lines 34-39). Thus, implicit in O'Hare's disclosure is that a system administrator will not provide access privileges to one

host to enable it to access portions of a storage resource allocated to another, but there is a risk of unintended and indirect access through the manner in which system call privileges are provided.

In view of the foregoing, O'Hare is directed to techniques for controlling access to a shared storage device. As an example, O'Hare states that it may be desirable to inhibit system calls to certain ports in the storage device to prevent access to portions of a storage device allocated for use by other devices. (col. 7, lines 20-29). O'Hare discloses that a security configuration control module 68 (Fig. 3) can provide information indicating whether system calls are to be accepted at a port, and the information can take one of three values indicating either no override, open override (indicating that regardless of any other security configuration settings the port will accept system calls), and close override (indicating that irrespective of any security configuration settings the port will not accept system calls). (col. 8, lines 1-15).

As shown in Fig. 5, O'Hare teaches that for one or more requestor groups and each of the available devices, access levels can be defined. Three types of access levels are shown, i.e., B, C and M, although O'Hare indicates that more than three potential access levels can be employed. (col. 11, lines 7-9).

Fig. 6 illustrates a method for responding to an access request. Initially, in acts 204 and 212, the method determines whether reject or pass overrides have been set, and then either denies or accepts the request accordingly. If no override is set, the method proceeds to process a number of steps to determine the ID of the requestor and the type of request, and then determines whether the request should be granted based upon the configuration settings for the appropriate requestor and the designated recipient device.

O'Hare does not specifically state what the various configuration settings that can be employed are, and provides no teaching or suggestion whatsoever that a non-media access request to a logical device can be granted for a device that has no data access privileges to the logical device.

2. Claim 1 Patentably Distinguishes Over O'Hare

Claim 1 is directed to a method for managing access to a shared resource by a plurality of devices. The method includes acts of: (a) in response to a non-media access request by a first of the plurality of devices to a logical device at the shared resource for which the first device has

no data access privileges, determining whether the first device is authorized to have non-media access to the logical device; and (b) authorizing the non-media access request when it is determined in the act (a) that the first device is authorized to have non-media access to the logical device.

As mentioned above, there is simply no teaching or suggestion in O'Hare of authorizing a non-media access request to a logical device from a device that has no data access privileges for that logical device. The Office Action asserts that this feature of claim 1 is disclosed at col. 10, lines 13-14 of O'Hare, indicating that "this condition occurs when access control of the system includes read and write operations and when read and write operation access types are not allowed for the first device to the logical device at the shared resource; each requesting device is allowed access to certain regions of the shared resource for certain access types, refer to C10-C14; Fig. 5 and Fig. 6." (Office Action pages 2-3). Applicants respectfully disagree.

At col. 10, lines 13-14, O'Hare simply discloses that for some system calls, the nature of the access control includes performing read and write operations, whereas other system calls involve the performance of only system administrative calls. This does not disclose what is recited in claim 1 for several reasons.

First, to the extent a system call referenced by O'Hare includes performing read and write operations, such a system call would not meet the above-recited definition of a "non-media access request" as defined in the present application.

Second, the cited sections of O'Hare do not disclose the authorizing of a non-media access request to a logical volume for a device that lacks data access privileges to that logical device. While the Office Action indicates that O'Hare teaches that each requesting device is allowed access to certain regions of the shared resource for certain access types, that does not disclose what is recited in claim 1. It should be appreciated that having the authorization to perform a non-media access typically requires a higher level of privilege than performing a data access, such that in most systems any device having privileges to perform a non-media access request would be expected to also have data access privileges. There is simply no teaching or suggestion in O'Hare to authorize a non-media access request to a logical device from a device that lacks data access privileges to that logical device.

As should be appreciated from the foregoing, claim 1 patentably distinguishes over O'Hare, such that the rejection of claim 1 under §102 as purportedly being anticipated by O'Hare should be withdrawn.

Claims 2-14 depend from claim 1 and are patentable for at least the same reasons.

3. Claim 15 Patentably Distinguishes Over O'Hare

Claim 15 is directed to a method for managing access to a storage system by a plurality of devices, the storage system including a plurality of logical volumes of data. The method includes acts of: (a) maintaining, in a data structure that is accessible to a filter that controls access to each of the plurality of logical volumes, configuration information identifying each logical volume to which data access by a first device is authorized; (b) in response to a non-media access request by the first device to a first logical volume for which the first device has no data access privileges, determining whether the first device is authorized to have non-media access to the first logical volume; and (c) authorizing the non-media access request when it is determined in the act (b) that the first device is authorized to have non-media access to the first logical volume.

As should be appreciated from the foregoing, O'Hare does not teach or suggest an act of authorizing a non-media access request to a logical volume from a device that does not have data access privileges for the logical volume. Therefore, it is respectfully asserted that claim 15 patentably distinguishes over O'Hare, such that the rejection of claim 15 under §102 as being anticipated by O'Hare should be withdrawn.

Claims 16-27 depend from claim 15 and are patentable for at least the same reasons.

4. Claim 28 Patentably Distinguishes Over O'Hare

Claim 28 is directed to an apparatus for use in a computer system including a plurality of devices and a shared resource. The apparatus comprises, *inter alia*, at least one filter that is responsive to a non-media access request by a first of the plurality of devices to a logical device at the shared resource for which the first device has no data access privileges, to determine whether the first device is authorized to have non-media access to the logical device, and to

authorize the non-media access request when it is determined that the first device is authorized to have non-media access to the logical device.

As should be appreciated from the foregoing, O'Hare does not teach or suggest an apparatus that includes at least one filter to authorize a non-media access request to a logical device from a device that has no data access privileges for the logical device. Therefore, claim 28 patentably distinguishes over O'Hare, such that the rejection of claim 28 under §102 as being anticipated by O'Hare should be withdrawn.

Claims 29-42 depend from claim 28 and are patentable for at least the same reasons.

5. Claim 43 Patentably Distinguishes Over O'Hare

Claim 43 is directed to a computer readable medium comprising a data structure relating to access management by a plurality of network devices to data stored on a plurality of logical devices. The data structure includes a plurality of records, each corresponding one of the network devices, and a first record corresponding to a first of the network devices and including configuration information identifying each of the logical devices to which data access by the first network device is authorized. The first record further includes visibility information identifying whether the first network device is authorized to have non-media access to a first of the plurality of logical devices when the configuration information corresponding to the first network device identifies that no data access to the first logical device from the first network device is authorized.

As should be appreciated from the foregoing, there is no teaching or suggestion in O'Hare of providing a data structure relating to access management for network devices wherein a record in the data structure includes visibility information identifying whether a first network device that has no data access privileges to a first logical device is nevertheless authorized to have non-media access to the first logical device. Therefore, it is respectfully asserted that claim 43 patentably distinguishes over O'Hare, such that the rejection of claim 43 under §102 as being anticipated by O'Hare should be withdrawn.

Claims 44-47 depend from claim 43 and are patentable for at least the same reasons.

6. Claim 48 Patentably Distinguishes Over O'Hare

Claim 48 is directed to an apparatus for use in a computer system including a plurality of devices in a storage system. The apparatus comprises, *inter alia*, a data structure that stores configuration information identifying each logical volume on the storage system to which data access by a first device is authorized, and at least one filter that is responsive to a non-media access request by the first device to a first logical volume for which the first device has no data access privileges, to determine whether the first device is authorized to have non-media access to the first logical volume and to authorize the non-media access request when it is determined that the first device is authorized to have non-media access to the first logical volume.

As should be appreciated from the foregoing, O'Hare does not disclose an apparatus that comprises at least one filter to authorize a non-media access request to a first logical volume for a first device that has no data access privileges for the first logical volume. Therefore, it is respectfully asserted that claim 48 patentably distinguishes over O'Hare, such that the rejection of claim 48 under §102 as being anticipated by O'Hare should be withdrawn.

Claims 49-59 depend from claim 48 and are patentable for at least the same reasons.

7. Claim 60 Patentably Distinguishes Over O'Hare

Claim 60 is directed to a storage system comprising a plurality of storage devices that store a plurality of logical volumes; a data structure to store configuration information; and a filter to selectively forward non-media access requests from a first network device to a first logical volume when the configuration information identifies that no data access to the first logical volume from the first network device is authorized.

As should be appreciated from the foregoing, O'Hare does not teach or suggest a storage system that comprises a filter that selectively forwards non-media access requests from a first network device to a first logical volume when configuration information identifies that no data access to the first logical volume from the first network device is authorized. Therefore, it is respectfully asserted that claim 60 patentably distinguishes over O'Hare, such that the rejection of claim 60 under §102 as being anticipated by O'Hare should be withdrawn.

Claims 61-66 depend from claim 60 and are patentable for at least the same reasons.

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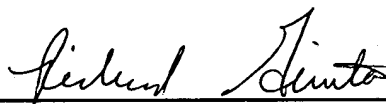
Art Unit: 2187

CONCLUSION

In view of the foregoing remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call Applicants' attorney at the telephone number listed below to discuss any outstanding issues relating to the allowability of the application.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,
Steven M. Blumenau et al., Applicant(s)

By: 
Richard F. Giunta, Reg. No. 36,149
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, Massachusetts 02210-2211
Telephone: (617) 720-3500

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